

EDUCATION

Purdue University | Masters in Robotics | GPA - 3.57/4

Aug 2024 - May 2026

Relevant Courses: Artificial Intelligence, Machine Learning, Intro to Robotics, Theory and Design of Control Systems

Savitribai Phule Pune University | Bachelor of Eng-Mechanical | GPA: 3.67/4

Aug 2018 - Jun 2022

SKILLS

Programming: Python, C++, MATLAB

Robotics Frameworks: ROS2 (Nodes, Topics, Services, Gazebo, Rviz), Docker, Git

Autonomy & Perception: SLAM (LiDAR/Scan Matching), Computer Vision, Motion Planning (RRT*, MPC, Pure Pursuit)

Embedded Systems: CAN Protocols, NVIDIA Jetson Orin Nano, Raspberry Pi, Arduino UNO

PROJECTS

F1Tenth Autonomous Vehicle Platform | ROS2, C++, Python, OpenCV, Linux

- Localization: Implemented a scan matching using LiDAR, achieving robust pose estimation in dynamic racing environments with <5 cm positional accuracy.
- Perception: Trained YOLOv8L models on custom datasets for real-time object detection, achieving 95% accuracy in obstacle tracking. Currently working on gap-following algorithm for enhanced autonomous navigation.
- Motion Planning: Developed RRT* and Pure Pursuit + Model Predictive Control (MPC)* algorithms for dynamic trajectory optimization, improving lap times by 20% while avoiding collisions.
- Control Systems: Designed a PID-based safety node for wall-following and collision avoidance, reducing navigation errors by 30% in high-speed scenarios.
- System Integration: Built the autonomous vehicle platform by integrating NVIDIA Jetson Orin Nano with a Traxxas RC car chassis, and LiDAR and camera sensors for real-time environmental perception.

Universal Robot Motion Planning| C++, Rviz, ROS2

- Implemented Inverse Kinematics for 6-DOF Arm: Developed a Python solver using screw theory and Newton-Raphson iteration to compute joint angles for precise end-effector positioning, validated via ROS2/Rviz simulation.
- Automated Trajectory Tracking: Generated and verified smooth Lissajous curve paths with velocity optimization, ensuring real-time kinematic feasibility through iterative FK/IK validation.

PROFESSIONAL EXPERIENCE

Purdue AI Racing Team

W Lafayette, USA

Graduate Intern (Software)

Oct 2024 - Present

- Localization & Sensor Fusion: Implemented Extended Kalman Filter (EKF) for the better performance and accuracy of the localization.
- Investigate CNN-based dynamic grouping convolution techniques to enhance multi-modal sensor fusion, optimizing feature extraction and improving perception accuracy for autonomous systems.

Devise Electronics Pvt Ltd

Pune,India

Software Developer Engineer

May 2023 - May 2024

- Real-Time Data Processing: Developed a Python-based CAN signal analysis tool with a Qt UI, enabling real-time data export and visualization for hardware debugging, reducing debugging time by 40%.
- Throttle System Design: Designed and implemented a throttle control system for electric vehicles, improving handling and responsiveness by optimizing throttle input processing and integration with vehicle control systems.
- Embedded Systems: Implemented CAN communication protocols on embedded Linux (Raspberry Pi) for vehicle instrument clusters, ensuring real-time data exchange and system reliability. Collaborated with mechanical CAD and harnessing teams.

ACADEMIC RESEARCH

Design and Manufacturing of Miniature Turbine for Automobile

- Designed a vehicle-mounted vertical-axis wind turbine to convert wind energy into electricity for charging EV batteries, reducing fossil fuel dependence. Modeled components in CREO, analyzed performance using ANSYS simulations, and optimized blade design for 375-400 RPM output at 50 km/h.
- Achieved 106.66 V output, extending EV range and lowering emissions by supplementing battery charge with renewable energy.